BATCO

(BATTLEFIELD CODE)

BATCO

INTRODUCTION.

BATCO is a paper numerical code and was introduced into the Army in 1984, replacing older code systems.

It has been specifically designed for ease of use, therefore the security protection it provides depends on strict adherence to the rules of use.

Unauthorized adaptation of these rules weakens the code and is strictly forbidden.

BATCO

DESCRIPTION.

BATCO is printed in double sided sheet form which fits into a purpose-made wallet; the latter also incorporates a sliding cursor to aid use.

The code can be used on both formation and unit level nets.

A single side of a page is normally valid for one day or 24 hour period.

In addition to the code, an authentication table and callsign indicators are printed on the page.

Let us look at a complete BATCO page

RESTRICTED

EDITION NO 399 PAGE NO 23 COPY NO 001

PERIOD OF USE: FROM TO

2	3	4	5	6	7	0	0	1	2	3	4	5	6	7	8	9	CH	•
D	E	W	L	Z	H	XD	QS	VO	WA	ET	NZ	CG	JP	FY	RK	LI	UH	MB
Y	H	U	M	G	Z	ZW	JE	CI	PF	XV	ON	LH	DU	YG	RS	MT	KB	QA
P	L	O	I	L	B	JL	ZA	GV	PW	QH	XD	RN	OY	SK	FU	BM	TE	CI
B	A	Q	W	I	Q	ZB	MA	OJ	UP	LH	EC	RX	WG	KV	NQ	YI	SF	TD
L	F	G	J	O	V	BD	OR	GL	QH	TE	XJ	CA	PZ	IS	NF	YM	KW	VU
C	R	H	X	W	D	EO	JW	ZU	MA	NQ	PB	XK	FC	LH	SV	GR	DY	TI
U	M	P	S	U	G	TN	US	RK	YP	GA	EB	JQ	VL	HW	XI	CD	FZ	OM
Z	D	V	D	V	S	IW	GX	OY	TK	CV	QF	RM	HJ	UZ	PS	LA	BD	EN
O	Q	B	C	M	K	FV	JU	XO	ET	SI	YM	AH	GC	BL	WK	NR	ZQ	PD
W	N	I	G	J	L	BS	ZF	PE	UQ	VG	NK	DL	YR	OX	IC	JM	WA	TH
F	V	X	H	B	R	TA	UN	ZW	PC	QO	KX	DG	SH	IF	LE	VB	JM	YR
V	C	R	O	T	I	NV	ZH	BM	RX	FE	GK	JT	CY	LI	UQ	WP	AS	DO
T	K	Y	P	P	M	FE	MP	YR	LT	SI	HD	VC	GW	UX	QB	OZ	JA	NK
I	J	E	E	S	C	ZF	BE	WX	PU	CG	LQ	NY	VM	OI	SD	KH	JT	AR
A	O	T	U	C	T	LU	WZ	KE	MH	BF	ND	XI	VP	AS	YR	OT	QJ	CG
J	T	Z	Y	R	A	NU	TK	BH	WA	VD	JY	ML	EQ	FC	OG	RX	IP	SZ
H	S	F	V	K	X	JF	OS	UC	LM	AQ	HB	VI	TZ	NR	PD	XG	YK	WE
K	G	L	K	Y	E	BP	ON	ED	SM	LY	HZ	WF	XC	GI	TR	JU	KA	VQ
R	Z	K	A	D	N	GB	YC	JP	FW	TX	MO	HV	RI	ND	KU	ZQ	LS	AE
M	X	N	T	E	U	UC	WF	ED	IY	MH	VP	BK	ZJ	RS	LG	ON	AT	XQ
E	I	A	Q	H	O	NU	FT	LJ	MS	XH	RA	CK	PW	GY	ZB	OV	EI	QD
G	B	S	R	Q	W	UO	RA	TN	KC	EH	QD	SF	LY	IJ	ZP	MX	WV	GB
S	U	D	N	N	P	KN	VF	OY	JD	RP	AS	QH	ZE	GB	CU	XT	LM	WI
N	P	J	F	F	Y	YA	SL	ZX	NE	MG	WP	OR	FT	IQ	DB	HJ	UC	KV
X	Y	M	B	X	F	WE	QK	FS	LD	HV	YT	AG	XB	OC	NM	JZ	UR	PI
Q	W	C	Z	A	J	RC	ZG	FB	HM	QA	TL	DV	PX	NW	SK	OE	UY	IJ

	5	4	7	3	1	0			0	1	2	3	4	5	6	7	8	9
3	I	T		O	D			9	47	03	38	12	13	51	34	67	73	49
9	N	X	S	A	W	Q		6	69	71	68	95	98	25	72	86	53	97
5	U	B	K			F		0	84	06	80	42	33	32	29	02	31	52
6	P	H	C	Z	M	V		8	11	54	70	91	77	23	56	89	99	78
2	R	Y	L	J	G	E		7	76	22	01	74	14	36	10	21	30	94

H	F	L	V	B	Y	C	R	D	N	Q	X	E	A	U	J	M	O	I	K	W	G	T	S	P
3	3	2	3	2	2	2	4	3	2	4	4	3	4	3	2	3	4	2	2	4	4	3	2	2

RESTRICTED

BATCO

The sheet consists of 6 main parts which are:

- The Heading.
- The Setting Field.
- Cipher Alphabet & Plain Text Digits.
- Spelling Box.
- Authentication Table.
- Callsign and Starting Column Indications.

HEADING

RESTRICTED

EDITION NO 399 PAGE NO 23 COPY NO 001

PERIOD OF USE: FROM TO

Edition.

Gives the edition the sheet is from. An edition consists of 36 pages.

Page Number.

Usually day/date related.

RESTRICTED

EDITION NO 399 PAGE NO 23 COPY NO 001

PERIOD OF USE: FROM TO

Copy Number.

Keeps a record of distribution.

Period of use.

Should be used if sheet is not day/date related.

THE SETTING FIELD

2	3	4	5	6	7
D	E	W	L	Z	H
Y	H	U	M	G	Z
P	L	O	I	L	B
B	A	Q	W	I	Q
L	F	G	J	O	V
C	R	H	X	W	D
U	M	P	S	U	G
Z	D	V	D	V	S
O	Q	B	C	M	K
W	N	I	G	J	L
F	V	X	H	B	R
V	C	R	O	T	I
T	K	Y	P	P	M
I	J	E	E	S	C
A	O	T	U	C	T
J	T	Z	Y	R	A
H	S	F	V	K	X
K	G	L	K	Y	E
R	Z	K	A	D	N
M	X	N	T	E	U
E	I	A	Q	H	O
G	B	S	R	Q	W
S	U	D	N	N	P
N	P	J	F	F	Y
X	Y	M	B	X	F
Q	W	C	Z	A	J

6 columns numbered from 2 to 7.

Each column has a random alphabet underneath it.

A column number and a letter form the **KEY SETTING**.

Column 7 is only used in emergencies or when ordered to by Higher Authority.

CIPHER ALPHABET
and
PLAIN TEXT DIGITS

0	0	1	2	3	4	5	6	7	8	9	CH	•
XD	QS	VO	WA	ET	NZ	CG	JP	FY	RK	LI	UH	MB
ZW	JE	CI	PF	XV	ON	LH	DU	YG	RS	MT	KB	QA
JL	ZA	GV	PW	QH	XD	RN	OY	SK	FU	BM	TE	CI
ZB	MA	OJ	UP	LH	EC	RX	WG	KV	NQ	YI	SF	TD
BD	OR	GL	QH	TE	XJ	CA	PZ	IS	NF	YM	KW	VU
EO	JW	ZU	MA	NQ	PB	XK	FC	LH	SV	GR	DY	TI
TN	US	RK	YP	GA	EB	JQ	VL	HW	XI	CD	FZ	OM
IW	GX	OY	TK	CV	QF	RM	HJ	UZ	PS	LA	BD	EN
FV	JU	XO	ET	SI	YM	AH	GC	BL	WK	NR	ZQ	PD
BS	ZF	PE	UQ	VG	NK	DL	YR	OX	IC	JM	WA	TH
TA	UN	ZW	PC	QO	KX	DG	SH	IF	LE	VB	JM	YR
NV	ZH	BM	RX	FE	GK	JT	CY	LI	UQ	WP	AS	DO
FE	MP	YR	LT	SI	HD	VC	GW	UX	QB	OZ	JA	NK
ZF	BE	WX	PU	CG	LQ	NY	VM	OI	SD	KH	JT	AR
LU	WZ	KE	MH	BF	ND	XI	VP	AS	YR	OT	QJ	CG
NU	TK	BH	WA	VD	JY	ML	EQ	FC	OG	RX	IP	SZ
JF	OS	UC	LM	AQ	HB	VI	TZ	NR	PD	XG	YK	WE
BP	ON	ED	SM	LY	HZ	WF	XC	GI	TR	JU	KA	VQ
GB	YC	JP	FW	TX	MO	HV	RI	ND	KU	ZQ	LS	AE
UC	WF	ED	IY	MH	VP	BK	ZJ	RS	LG	ON	AT	XQ
NU	FT	LJ	MS	XH	RA	CK	PW	GY	ZB	OV	EI	QD
UO	RA	TN	KC	EH	QD	SF	LY	IJ	ZP	MX	WV	GB
KN	VF	OY	JD	RP	AS	QH	ZE	GB	CU	XT	LM	WI
YA	SL	ZX	NE	MG	WP	OR	FT	IQ	DB	HJ	UC	KV
WE	QK	FS	LD	HV	YT	AG	XB	OC	NM	JZ	UR	PI
RC	ZG	FB	HM	QA	TL	DV	PX	NW	SK	OE	UY	IJ

26 rows of scrambled alphabets in two digit groups.

At the top there are plain digits 0 - 9 (0 being repeated twice), CH standing for change and a decimal point.

BATCO

The CH allows the operator to switch from figures to digits.

The decimal point (.) is used in frequencies or it can be used in Secure Orders Cards.

SPELLING BOX

	5	4	7	3	1	0
3	I	T		O	D	
9	N	X	S	A	W	Q
5	U	B	K			F
6	P	H	C	Z	M	V
2	R	Y	L	J	G	E

Provides the facility to spell words.

Consists of two rows of numbers, forming a grid.

Inside there is a scrambled alphabet.

AUTHENTICATION BOX

	0	1	2	3	4	5	6	7	8	9
9	47	03	38	12	13	51	34	67	73	49
6	69	71	68	95	98	25	72	86	53	97
0	84	06	80	42	33	32	29	02	31	52
8	11	54	70	91	77	23	56	89	99	78
7	76	22	01	74	14	36	10	21	30	94

Provides the facility to authenticate bogus or enemy stations.

THE STARTING COLUMN INDICATOR

H	F	L	V	B	Y	C	R	D	N	Q	X	E	A	U	J	M	O	I	K	W	G	T	S	P
3	3	2	3	2	2	2	4	3	2	4	4	3	4	3	2	3	4	2	2	4	4	3	2	2

Used to find the start point of the days BATCO.

It is used in conjunction with the PCI (Primary Callsign Indicator).

BATCO

RULES FOR BATCO.

No unauthorized modifications.

Maximum of 22 encryptions per key setting. (where combined length of a question and its immediate answer is no longer than 22 digits, the same row may be used).

New key setting for each message.

Use key settings, as far as possible, in alpha-numeric order.

BATCO

RULES FOR BATCO.

Use key setting once only on each net.

Use PROWORDS that introduce encoded numerals:

'GRID'	(for grid references).
'NICK'	(for nicknumbers).
'DIRECTION'	(for target indication).

BATCO

The plain text is encoded by reading off either of the two letters underneath the digit or symbol.

Where there is a repetition of a digit or symbol the alternative letter should be used.

Plain text is recovered from an encoded message by the reverse process.

MESSAGE PROCEDURE

BATCO

GENERAL RULES.

Unless the proword 'GRID', 'NICK' or 'DIRECTION' is used, the first tri-gram of a BATCO message encodes a Vocabulary (Vocab) Card number.

Some Vocab serial numbers introduce simple formats like 'move to GRID…….. (6figs)'. The missing figures are sent, encoded, immediately following the Vocab serial number. On decoding the numbers are inserted in the format.

BATCO

GENERAL RULES.

Vocab serial numbers also introduce formats for Reports and Returns and Secure Orders Cards (SOCs).

These formats are sent by encoding the report number and sending the format serial by serial.

The card serial number is sent in clear with the content encoded. Serials which do not apply are omitted.

BATCO

GENERAL RULES.

When an undefined number is being encoded, ie a quantity, the word ‘FIGURES’ is extracted from the Vocab Card indicating the start, and the symbol ‘CH’ is used to denote the end of the number and means that the next bi-gram will be a Vocab serial number.

BATCO

GENERAL RULES.

In order to maintain the integrity of the code and hence the protection it provides, the following applies:

No more than 22 digits must be encoded using one setting; if the message is longer than 22 digits the next setting must be used.

When a message is longer than 22 digits, the change should be made at a suitable point in the text before the 22nd digit.

BATCO

GENERAL RULES.

If a station is preparing a long message on one setting and discovers that another station has transmitted a message using the same setting, it is permissible for the first station to transmit its message without changing the setting.

Should a station lose track of the progression through the settings it should ask the control station which setting to use. The prowords 'SEND SETTING' can be used for this purpose.

BATCO

GENERAL RULES.

A message may be retransmitted on another net without having to be re-encoded provided, of course, the recipient on the second net can decode it.

Remain on the last card identified in a message after plain text has been used.

Triagrams are to be sent as and when they occur. Otherwise the encoded message is to be sent as a series of Biagrams.

BATCO

GRID REFERENCES.

Where the only portion of a message to be encoded is a grid reference, then the proword 'GRID' is used followed by the grid reference directly encoded in BATCO.

For unit use it will not normally be necessary to use the UTM designating letters to avoid ambiguity of location, but where a UTM is necessary the proword 'AREA' is used before 'GRID'. The UTM letters following the proword should not be encoded.

BATCO

NICKNUMBERS.

Nicknumbers are encoded in two ways. Either that are encoded in the same way as grid references using the proword 'NICK' instead of 'GRID' or, for a specific operation they are allocated to serials within Vocab Card 012, and encoded as for a Vocab Card serial.

BATCO

SPELLING.

Spelling with BATCO is authorized only when no suitable vocabulary is available in Vocab Cards and sending the text in clear would give the enemy useful information:

- Names of service personnel.
- Locations which cannot be described by a grid reference.
- Items specific to a unit's type or function.

BATCO

SPELLING.

Spelling is achieved through the spelling box, where a letter where a letter is identified by its column and row number:

A = 39

P = 56

T = 43

These are then encoded, introduced by a Vocab number which means 'Spelling Starts', and concluded with the letter representing the 'CH' symbol in the plain text on the BATCO sheet.

BATCO

SENDING.

In order to facilitate decoding and reduce the signature of some formatted texts, BATCO should be sent as follows:

The key setting is to be sent immediately before the first tri-gram on that setting (or the first bi-gram in the case of the prowords 'GRID', 'NICK' or 'DIRECTION' being used).

BATCO

SENDING.

Where encoded text produced bi-grams, eg a Vocab number or encoded grid reference, these are to be sent as bi-grams, eg ‘123456’ would be sent as ‘AB CD EF’.

Where the encoded text is a 3, 5 etc figure group, then bi-grams are to be sent except, for the last three digits which are sent as a tri-gram, eg the number ‘6,457,320’ would be sent as ‘AB CD EFG’.

BATCO

SENDING.

Some Vocab Card serials may be amplified by a third figure which denotes a specific qualification. The resulting tri-gram should be sent in its natural position in the text.

Where CH or a decimal point stands alone it is combined with the preceding bi-gram and sent as a tri-gram, eg the number '45.7600' would be sent as 'ABC DE FG' (where C = decimal point).

Let us now look at how to Encode using BATCO

BATCO

ENCODING.

Encode GRID 894 376 using key setting 6M

8	9	4	3	7	6

BATCO

ENCODING.

Encode GRID 894 376 using key setting 6M

8	9	4	3	7	6
W	N	Y	S	B	G
K	R	M	I	L	C

BATCO

ENCODING.

Encode GRID 894 376 using key setting 6M

8	9	4	3	7	6
W	N	Y	S	B	G

ANSWER: GRID 6M WN YS BG

Encode the following grids:

567893 Key Setting 6N

231123 Key Setting 6O

BATCO

ENCODING.

Encode GRID 567 893 using key setting 6N

5	6	7	8	9	3

BATCO

ENCODING.

Encode GRID 567 893 using key setting 6N

5	6	7	8	9	3
Q	Z	G	C	X	R
H	E	B	U	T	P

BATCO

ENCODING.

Encode GRID 567 893 using key setting 6N

5	6	7	8	9	3
Q	Z	G	C	X	R

ANSWER: GRID 6N QZ GC XR

BATCO

ENCODING.

Encode GRID 231 123 using key setting 6O

2	3	1	1	2	3
Q	T	G	G	Q	T
H	E	L	L	H	E

BATCO

ENCODING.

Encode GRID 231 123 using key setting 6O

2	3	1	1	2	3
Q	T	G	L	H	E

ANSWER: GRID 6O QT GL HE

Let us now look at how to Decode using BATCO

BATCO

DECODING.

Decode GRID 6P YL SH VC

Y	L	S	H	V	G

BATCO

ENCODING.

Decode GRID 6P YL SH VC

Y	L	S	H	V	G
1	2	3	4	5	6

ANSWER: GRID 123 456

Decode the following grids:

6Q KQ LZ UO
6R FB MN HJ

BATCO

DECODING.

Decode GRID 6Q KQ LZ UO

K	Q	L	Z	U	O

BATCO

ENCODING.

Decode GRID 6Q KQ LZ UO

K	Q	L	Z	U	O
2	4	6	8	0	0

ANSWER: GRID 246 800

BATCO

DECODING.

Decode GRID 6R FB MN HJ

F	B	M	N	H	J

BATCO

ENCODING.

Decode GRID 6R FB MN HJ

F	B	M	N	H	J
7	1	5	0	1	4

ANSWER: GRID 715 014

Let us now look at how to use the Authentication Box

BATCO

AUTHENTICATION.

Hello 0 This L43 Send Key Setting over.

0 Authenticate 17 over.

I Authenticate 22 over.

Correct 6S out.

0		0	1	2	3	4	5	6	7	8	9
	9	47	03	38	12	13	51	34	67	73	49
	6	69	71	68	95	98	25	72	86	53	97
	0	84	06	80	42	33	32	29	02	31	52
	8	11	54	70	91	77	23	56	89	99	78
→	7	76	22	01	74	14	36	10	21	30	94

L43

Decode the following Authentication

36

88

BATCO

AUTHENTICATION.

36

	0	1	2	3	4	5	6	7	8	9
9	47	03	38	12	13	51	34	67	73	49
6	69	71	68	95	98	25	72	86	53	97
0	84	06	80	42	33	32	29	02	31	52
8	11	54	70	91	77	23	56	89	99	78
7	76	22	01	74	14	36	10	21	30	94

BATCO

AUTHENTICATION.

36

	0	1	2	3	4	5	6	7	8	9
9	47	03	38	12	13	51	34	67	73	49
6	69	71	68	95	98	25	72	86	53	97
0	84	06	80	42	33	32	29	02	31	52
8	11	54	70	91	77	23	56	89	99	78
7	76	22	01	74	14	36	10	21	30	94

Answer: 95

BATCO

AUTHENTICATION.

88

	0	1	2	3	4	5	6	7	8	9
9	47	03	38	12	13	51	34	67	73	49
6	69	71	68	95	98	25	72	86	53	97
0	84	06	80	42	33	32	29	02	31	52
8	11	54	70	91	77	23	56	89	99	78
7	76	22	01	74	14	36	10	21	30	94

BATCO

AUTHENTICATION.

88

	0	1	2	3	4	5	6	7	8	9
9	47	03	38	12	13	51	34	67	73	49
6	69	71	68	95	98	25	72	86	53	97
0	84	06	80	42	33	32	29	02	31	52
8	11	54	70	91	77	23	56	89	99	78
7	76	22	01	74	14	36	10	21	30	94

Answer: 99

Let us now look at how to use the Spelling Box

BATCO

SPELLING.

Using the Spelling Box the following word is encoded like so ‘PARA’.

	5	4	7	3	1	0
3	I	T		O	D	
9	N	X	S	A	W	Q
5	U	B	K			F
6	P	H	C	Z	M	V
2	R	Y	L	J	G	E

P = 56

A = 39

R = 52

A = 39

BATCO

SPELLING.

Now that ‘PARA’ has been put into number code, it must be encoded on the BATCO sheet.

Using the Key Setting of 6L.

P = 56

A = 39

R = 52

A = 39

P	A	R	A
56	39	52	39
RO	QB	RP	QB
NY	HM	NW	HM

BATCO

SPELLING.

Using the Spelling Box decode the following word ‘6M BR SI LG’BA.

BR	SI	LG	BA
79	33	76	75

BATCO

SPELLING.

Using the Spelling Box decode the following word ‘6M BR SI LG’BA.

BR	SI	LG	BA
79	33	76	75
S	O	C	K

FINAL CONFIRMATION

Encode (6S)	456987
Encode (6T)	178423
Decode (6U)	YJ VS CT
Encode (6V)	300809
Decode (6W)	RXLJNQ
Decode (6X)	YXEBXF

BATCO

FINAL CONFIRMATION.

4	5	6	9	8	7
L	N	V	K	S	O
Q	Y	M	H	D	I

ANSWER: GRID 6S LN VK SO

BATCO

FINAL CONFIRMATION.

1	7	8	4	2	3
B	L	U	G	R	F
M	I	Q	K	X	E

ANSWER: GRID 6T BL UG RF

BATCO

FINAL CONFIRMATION.

Y	J	V	S	C	T
2	5	6	0	9	0

ANSWER: GRID 256 090

BATCO

FINAL CONFIRMATION.

3	0	0	8	0	9
C	I	I	P	I	L
V	W	W	S	W	A
	G	G		G	
	X	X		X	

ANSWER: GRID 6V C I WP GL

BATCO

FINAL CONFIRMATION.

R	X	L	J	N	Q
9	5	7	0	3	3

ANSWER: GRID 957 033

BATCO

FINAL CONFIRMATION.

Y	X	E	B	X	F
4	6	0	6	6	1

ANSWER: GRID 460 661